

AN INFORMATION SYSTEM FOR AMBULATORY CARE

Alfred E. Garratt, Ph.D.

Office of Research and Development, Indian Health Service

ABSTRACT

The Indian Health Service operates a complex, multi-level, physically dispersed health delivery system in providing health care to approximately 750,000 American Indians and Alaska Natives. To support the delivery of comprehensive health care and to provide for continuity of care in this environment, the IHS has designed, developed and is now field testing the Patient Care Information System.

THE SETTING

The Indian Health Service (IHS) is responsible for the delivery of comprehensive health care to approximately 750,000 American Indians and Alaska Natives. The Prevalence of major health problems among IHS beneficiaries, who are generally distributed over large often remote, rural Areas, is significantly greater than for the United States population as a whole.

In order to provide adequate access to health care for its beneficiaries, the IHS operates 52 hospitals, 99 full-time health centers and several hundred health stations. The Indian Health Service also provides direct health care through field health programs such as public health nursing, mental health, social services, etc.; supports a variety of IHS-funded, tribally-operated field health programs such as nutrition, disease control, alcoholism, etc.; and makes extensive use of private facilities and provides for contract health care.

The IHS health delivery system is, therefore, a widely dispersed, multi-facility, multi-disciplinary, multi-organizational, multi-level system; the Patient Care Information System (PCIS) has been designed to operate in this environment, to support the delivery of comprehensive health care at each encounter, to provide for continuity of care as a patient moves through various levels of the delivery system, to monitor the status of preventive and early detection procedures for all patients and to support the planning and management of IHS health programs.

THE SYSTEM

The PCIS is a computer based information system that provides for the collection, storage, processing and display of patient-oriented health data that are required for the processes of patient care, program management, planning and administration. Computer support is provided by an IBM 370-145 computer located at the IHS Data Processing Center in Albuquerque, New Mexico.

Three major design concepts that are basic to the PCIS are (1) the patient-oriented data base, (2) multi-part, user-oriented encounter forms, and (3) provider feedback.

The patient-oriented data base means that PCIS maintains a single, functionally organized record for each patient which contains relevant health data from each encounter with all providers of care at all facilities. This concept implies unique patient identification to support the linkage of health data from all sources of care. The patient-oriented data base provides continuity of information over time as well as across facilities and providers.

The multi-part, user-oriented forms provide assurance that the information entered into the PCIS data base is identical to that going into the patients' charts. The PCIS encounter forms are three-part carbonless forms; the original sheet is the legal encounter record and is placed in the patient's chart; one copy is used as the PCIS data entry form; the record copy is available as a referral form or as an appointment slip.

Feedback is provided by Health Summaries which are generated by the system, from microfiche files, at each patient visit. These

summaries, which are updated bi-weekly, are made available to all providers of care, along with appropriate microfiche reader-printers and viewers. The Health Summary is a printed record, for a given patient, of significant health data from all sources of health care. The information in a Health Summary includes:

Identification and Demographic Data

- o Name
- o Current Residence
- o Sex
- o Date of Birth
- o Health Record Numbers
- o Register/Roster Numbers

Measurements

- o Height and Weight (with Percentiles for Pediatric Patients)
- o Head Circumference
- o Blood Pressure
- o Visual Acuity
- o Eyeglass Prescription
- o Tonometry Data
- o Audiometry Data

Problem Lists, Active and Inactive

- o Narrative Problems
- o Date, Location, Provider Data
- o Problem-linked Treatment Plans

Active Medications

- o Date
- o Generic Drug Name
- o Type - Strength
- o Dosage
- o Expiration Date

Recent Hospitalizations

- o Admission/Discharge Dates
- o Location
- o Discharge Diagnoses
- o Operations

Recent Outpatient and Field Encounters

- o Date
- o Location
- o Provider Discipline
- o Diagnoses
- o Procedures

Scheduled Encounters

- o Date
- o Provider
- o Narrative Purpose

Laboratory, X-Ray Results

- o Date
- o Type
- o Results

Immunizations, Skin Tests

- o Date
- o Location
- o Type
- o Series
- o Results

Clinical Prompts

- o Abnormal Lab Results
- o Expired Chronic Medications
- o Selected Diagnoses

Surveillance Status

- o Immunizations, Skin Tests
- o Lab, X-Ray Procedures
- o PAP, ECG
- o Special Examinations

The PCIS provides for the storage of selected types of free-form narrative inputs by providers. All diagnoses and problems, for example, are stored in narrative in addition to being coded to ICDA. All system outputs that support direct patient care utilize these narratives. This process assures that diagnostic specificity is not lost during the coding process and further assures that errors in coding do not impact on patient care.

The PCIS provides additional, extensive retrieval capabilities to support IHS planning and management needs. For example, a generalized retrieval program is available that permits a user to define his requirements in terms of population demographic characteristics (patient age, sex, residence), in terms of diagnostic or problem categories, in terms of provider characteristics (discipline and facility) and in terms of time frames. A typical request might be for a listing of female patients between the ages of 14 and 27, living in the communities of Ventana, Hickiwan or Vaya Chin, who had been seen at either the Sells Hospital or the Santa Rosa Clinic for the problems of hypertension or anemia between the 15th of May and the 8th of October, 1977.

SYSTEM STATUS

A prototype version of the PCIS has been operational in Southern Arizona since 1969 and in Central Alaska since 1974. The prototype system has been used to test the PCIS design concepts.

Two pilot tests of the PCIS have been implemented. The first pilot test includes all IHS facilities in the states of Montana and Wyoming. This implementation, which utilizes in-house staff for data processing support, has been operational since December 1978. The second pilot includes all IHS facilities, and some state health care facilities, in Alaska. The Alaska pilot, which utilizes contract support for data processing, has been operational since April 1979.

A third large-scale pilot is currently underway on the Navajo Reservation. Expansion of PCIS throughout the IHS is scheduled over the next several years.

EVALUATION ACTIVITIES

Two types of evaluation are scheduled for the pilot PCIS implementations; the first will be a user evaluation and the second an impact evaluation.

The user evaluation will address primarily the acceptability of the PCIS data collection forms in terms of organization, content, ease of use and flexibility, and the utility of the PCIS Health Summary in terms of organization and content. The user evaluation will be carried out by questionnaires and interviews.

The impact evaluation will be an extensive before and after study conducted in the Montana and Wyoming facilities. Approximately 100 problem-specific indicators have been defined and data collection protocols, based on review of patient charts, have been developed. Each indicator is associated with an hypothesis relating to the expected impact of PCIS on either the process or outcome of health care delivery. The before phase of the impact evaluation has already been completed; the after phase will be conducted at a date to be specified. The impact evaluation has been designed and implemented by the IHS Quality Assurance Branch.

SYSTEM BENEFITS

The principal benefits that accrue to the IHS as a result of the installation of PCIS are the following:

- o The PCIS enables providers of care to respond more comprehensively to the needs of each patient at each visit.
- o The PCIS improves continuity of patient care across facilities, across disciplines and over time.
- o The PCIS improves the delivery of preventive health care services to IHS beneficiaries.
- o The PCIS facilitates the early detection, and the early intervention and treatment, of major health problems.
- o The PCIS improves the utilization of health care resources in both clinic and field settings.
- o The PCIS provides more accurate statistics on the incidence and prevalence of health problems.

- o The PCIS provides improved access to information for program planning and management.

SYSTEM COSTS

The projected operational cost, for the IHS-wide implementation of PCIS, in terms of new resource requirements is \$3.2 million. With a projected workload of 3 million outpatient visits per year, the system cost is approximately \$1 per outpatient visit.